



An employee-management consensus approach to continuous improvement in safety management

Consensus
approach to
safety

405

Received: January 1999
Accepted: May 1999

Colin W. Fuller
Loughborough University, UK

Keywords *Employee involvement, Safety, United Kingdom, Oil industry, Distribution operations*

Abstract *This paper reports an employee-management consensus approach for identifying safety initiatives that are both appropriate to the working environment and also perceived to be appropriate by the workforce. Issues affecting the success of employee involvement schemes are discussed and the methods used during the implementation stages of the programme to address them are described. The case study was set in the UK distribution division of an international oil company and was applied to safety issues affecting the division's tanker drivers. The study used an employee questionnaire to assess drivers' perceptions of safety management, workplace conditions and safety concerns. Factor analysis and structural equation modelling were used to develop a management/workplace/workforce model to describe the drivers' working environment. The model was then used to discuss and explain the drivers' choices of safety initiatives.*

The case for an improvement in safety performance can, for most organisations, be argued on financial, legal and moral grounds. The important issue, however, is not the argument for the improvement but the process by which the corporate aims are translated into a programme that will achieve the desired safety performance. The basis for acceptable safety performance is generally recognised to be an established and robust safety management system (Health and Safety Executive, 1997; Smith *et al.*, 1998), which provides the means for controlling and monitoring performance. In 1997, over 80 per cent of companies, reporting safety performance through the Chemical Industries Association's Responsible Care programme, indicated that they had either a certified or a formal safety management system in place (Chemical Industries Association, 1998). Therefore, if this were the sole criterion for achieving acceptable safety performance, these and many other companies should already have reached their desired performance targets. With any management function, however, performance depends not just on management policies and procedures but on the development of effective operational practices, which are appropriate to the working environment and which are also perceived to be appropriate by the workforce implementing them. Continuing high performance requires employers to audit and review their management systems and operational practices in order to identify current strengths and weaknesses. Only then can initiatives be developed to address and remedy sources of significant residual risk within the workplace.

Many approaches for improving operational performance advocate employee involvement. Ramsay (1991) reviewed a range of employee involvement schemes and categorised them under four broad headings:

- (1) task/workgroup, e.g. quality circles;
- (2) communication, e.g. team briefs;
- (3) consultation, e.g. consultative committees; and
- (4) financial, e.g. employee share schemes.

Examples of all these categories are routinely used in industry for improving safety performance, such as workgroup-behavioural safety programmes, communication-toolbox talks, consultation-safety committees, and financial-safety performance incentives. However, each of these approaches provides employees with only limited input to the decision-making and problem-solving processes required for continuous improvement.

Employee co-operation and management commitment are promoted as key factors for achieving effective safety management (Health and Safety Executive, 1997). In addition, consultation between employers and employees on health and safety issues is a legal requirement under the Health and Safety (Consultation with Employees) Regulations 1996 and the Safety Representatives and Safety Committees Regulations 1977 (Health and Safety Executive, 1996a). Many organisations construe this legal requirement for consultation with employees to be the same as employee co-operation, whereas the activities are two quite separate issues. The legal requirements, regarding employee consultation, relate solely to employees having the opportunity to discuss and comment on management activities and initiatives. Employee co-operation includes employees being actively involved with management in decision making.

Operating a constructive policy of co-operation requires a high level of trust by all parties in the others' intentions and aspirations. Hurst (1998) highlighted the importance of trust between the various parties, when he discussed public involvement in risk assessment, and commented:

Creating and maintaining trust may require a degree of involvement with the public that goes far beyond public relations and two-way communication. It suggests levels of power sharing and public participation in decision making that have rarely been attempted (Hurst, 1998, p. 92).

This view is equally applicable when considering employees' involvement with management, where the aim is to improve risk management within the area of occupational safety.

Ramsay (1991) stated that employee involvement should provide part of a coherent and linked management programme and identified a number of important factors affecting the success of employee involvement initiatives:

- senior management commitment;
- middle and lower management support;

-
- definition of the initiative's objectives;
 - appropriate training and time available for those involved;
 - monitoring the scheme's implementation; and
 - provision of information and consultation on the process.

This case study reports the results obtained from an employee involvement initiative utilising a consensus approach between management and employees, as part of a continuous improvement programme in safety management. The outcomes from the initiative are discussed in terms of the employees' perceptions of safety management, working conditions and safety concerns within their work environment.

Organisational setting

The programme was implemented within the UK distribution division of an international oil company with an established safety management system using the Health and Safety Executive's guidelines for good management (Health and Safety Executive, 1997). The management system was therefore based on the elements of policy, organisation, planning/implementation, monitoring and review. The division's lost work injury frequency rate (LWIFR) had been low (0.4/100,000 man-hours) but largely static over the period 1994 to 1997. A lost work injury, defined within the company as "any incident resulting in one or more days' absence from work", is more stringent than that of "over three days' lost-time injury" reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (Health and Safety Executive, 1996b). The corporate aim for safety was for all divisions to achieve a zero LWIFR, with each division encouraged to develop and implement initiatives to strive towards this target. The workforce within the distribution division was around 800, of whom about 260 were drivers undertaking driving and delivery duties within six semi-autonomous subsidiaries. The customer base comprised some 83,000 retail and non-retail sites with annual deliveries of around 6 billion litres of heating oil and motor spirit. Drivers' duties involved lone-working and typically worked a ten-hour day but this often increased to 14 hours during the winter period. Whilst the major hazards within the division were related to the storage of motor spirit products, the safety performance, in terms of the LWIFR, was almost completely dependent on the performance of the distributor drivers. The storage and handling of all products at the division's depots and during transport of products from depot to customer were controlled by strict rule-based compliance requirements using competent drivers, who were trained to deal with routine and emergency situations that could arise both on and off public roads. However, once a driver arrived at a customer site, the control of many workplace hazards passed to a third party, who frequently had little understanding of, or regard for, safety issues. It was at this point that the risk of injury to drivers was normally at its greatest. In these circumstances, the drivers often found themselves working alone and

required to make critical decisions based on their own perceptions of risks, their perceptions of the company's views on risks and their desire to satisfy customers' needs.

Consensus programme

Historically, safety initiatives within the division had been considered to be the responsibility of management. These matters were discussed within the operational management group, which included the safety manager, and then implemented through depot managers within each of the subsidiary companies. A consensus approach to management therefore represented a significant change in management style and required a high level of commitment to the approach if the initiatives proposed were to be adopted. The programme, which was developed and implemented by an independent facilitator (the author), aimed to identify safety initiatives, which were acceptable to management and employees. It also addressed those factors mentioned earlier, identified by Ramsay (1991), that can affect the success of employee involvement initiatives.

Stage 1 – programme framework

The programme facilitator discussed the aims and objectives of the distribution division with the safety manager and outlined the general principles of the consensus approach. The safety manager then presented the programme framework to the operational management group for discussion and approval. The facilitator, using a semi-structured agenda at three meetings at typical distribution depots (representing rural, city and motorway operational activities and conditions), elicited drivers' views and concerns over safety and potential initiatives for addressing these concerns. The meetings, in company time, were limited to one hour and were held prior to the drivers starting their normal day's work. The depot manager, who was not present during the discussions, provided a suitable room and refreshments for each meeting. Following each meeting, the facilitator travelled and undertook normal work activities alongside one driver during the morning period and a second driver during the afternoon period. These provided the facilitator with the opportunity to experience and identify typical operational problems and to discuss in greater depth any issues raised during the group meetings. The division's operational management group also discussed its own views and concerns over safety and identified initiatives for addressing these concerns at a group management meeting chaired by the safety manager. The conclusions from this meeting were presented to the programme facilitator.

Following these meetings, the facilitator identified the main issues relating to safety and suggested four initiatives for improving safety performance raised by the management and employee groups. The outcome of this stage was the preparation of a draft questionnaire, which was subjected to a pilot study with a small group of six drivers and four managers, in order to test the content and structure of the questionnaire. The final questionnaire, distributed

to all drivers in the division, contained questions and statements relating to the following issues:

- *Demographics*: identifying drivers' subsidiary employer, depot type and location, age and workload.
- *Working conditions*: categorised by the frequencies with which drivers were expected to use vehicles with a fault, using a five-point scale from never (1) to regularly (5), and make deliveries to unsafe locations, using a five-point scale from not significant (1) to very significant (5).
- *Safety management*: categorised by 20 statements eliciting drivers' views on the division's policy, organisation, implementation and performance monitoring for safety; see Table I. Responses to the statements were provided using a five-point scale covering the range of views from strongly agree (1), agree (2), neither agree nor disagree (3), disagree (4) and strongly disagree (5). To minimise the possibility that responses were biased, the sequence of statements was randomised and statements were framed in both positive and negative formats with expectations of both positive and negative responses.
- *Safety concerns*: categorised by driving fatigue, length of working day and customer requirements, using a five-point scale for each element covering the range from not important (1) to very important (5).

Management area	Item number	Issue addressed
Policy	(1)	Provision of safe working conditions
	(2)	Commitment to high safety standards
	(3)	Safety training as a priority
	(4)	Safety as a management priority
Organisation	(5)	Procedures available for safety issues
	(6)	Responsible personnel competence in safety issues
	(7)	Employees informed on safety issues
	(8)	Time available to complete jobs safely
Implementation	(9)	Employees made aware of safety standards
	(10)	Checks made to ensure implementation of safe procedures
	(11)	Employees take risks to complete jobs
	(12)	Management accept unsafe practices to complete jobs
	(13)	Management correct unsafe situations
	(14)	Management set example over safety matters
Monitoring	(15)	Management willing to discuss safety concerns
	(16)	Management insists all accidents/near misses are reported
	(17)	Employees report all accidents/near misses
	(18)	After accidents causes of accidents are corrected by management
	(19)	Dissemination of results of accident investigations
	(20)	Dissemination of information on safety performance

Table I.
Issues used to elicit
drivers' views on
safety management

- *Safety initiatives*: made up of four proposals relating to a safe driver competition, use of financial incentives to influence safety performance, a drivers' panel to investigate accidents and incidents and a drivers' panel working with management to improve safety standards. Responses were recorded as yes or no.

Stage 2 – implementation

The division's safety manager distributed a letter to all drivers and depot managers outlining the aims of the programme, the confidential nature of the responses, how the results of the programme would be disseminated and a request for full co-operation with the programme facilitator. The facilitator distributed to every driver in a personally addressed envelope a questionnaire, a letter describing the purpose of the programme and a reply paid envelope addressed to the facilitator. The letter explained the background to the programme, how the content of the questionnaire had been developed, the independent position of the facilitator, the confidentiality of the drivers' responses and the contribution that the drivers could make to the division's future safety performance. Each depot manager also received copies of the questionnaire and letter distributed to the drivers, for information.

Stage 3 – analysis

All statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS v.8.0) for Windows; statistical significance was accepted at the $p < 0.05$ level. A paired sample *t*-test was used to compare responses on working conditions and safety concerns and a chi-square test to assess the responses to the proposed safety initiatives. Responses to the 20 statements on safety management were subjected to exploratory, principal components, factor analysis using orthogonal rotation of factors (Bryman and Cramer, 1997). Drivers' responses to negatively phrased statements were reversed to provide a uni-directional consistency of response before completing the factor analysis. Cronbach α values, as a measure of the internal scale consistency of the identified factors, are generally accepted as significant at values greater than 0.8 (Bryman and Cramer, 1997). Structural equation modelling, using path analysis (Bryman and Cramer, 1997), was carried out on the safety management factors identified and the aggregated responses for working conditions and drivers' concerns over safety to test possible relationships amongst the variables included in the survey.

Stage 4 – dissemination of results

The facilitator produced a summary of the results and conclusions from the programme for the operational management group. Copies of the same report were later distributed to the depot managers for circulation and discussion with all drivers. Conclusions reached from the factor analysis and structural equation modelling were not included within this report.

Stage 5 – action

The results and conclusions from the programme were discussed by the operational management group. Subsequently the division's general manager wrote to all drivers confirming his commitment to the implementation of the preferred initiatives identified by the drivers. The safety manager followed this by writing to all drivers detailing the actions to be implemented, timescales for completion and the part that employees would take in the process.

Analysis and results of the survey

Demographic data

A total of 156 replies were received from 261 drivers (60 per cent response) based at 53 distribution depots, situated throughout the UK. Age distribution of the respondents was 21 to 30 years – 4 per cent; 31 to 40 years – 27 per cent; 41 to 50 years – 33 per cent; and 51 to 65 years – 36 per cent. Depot locations of respondents were city/town – 60 per cent; rural – 33 per cent; and remote (e.g. island) – 7 per cent. Means and standard deviations for the numbers of deliveries per day for drivers were December to February – 15.8 ± 4.6 ; March to May – 11.6 ± 3.8 ; June to August – 9.9 ± 3.6 ; and September to November – 13.4 ± 4.3 . These results were assessed by the division's safety manager, who confirmed that they were representative of the organisation.

Working conditions

The mean and standard deviation scores, relating to drivers' working conditions, were:

- (1) frequency at which drivers were expected to use faulty vehicles – 1.81 ± 0.95 ; and
- (2) deliveries to unsafe locations – 3.44 ± 1.51 . Working conditions arising from deliveries to unsafe locations were rated significantly ($p < 0.01$) worse than those from driving faulty vehicles.

Safety management

The mean and standard deviation scores relating to the 20 statements on safety management are shown in Table II. Factor analysis identified three factors, representing management control, safety standards and personal risk taking, which together accounted for 57 per cent of the variance in the data; the loading for each item on the appropriate factors are also shown in Table II. The loading values are all greater than 0.4 and statistically significant ($p < 0.01$), indicating acceptable reliability. Cronbach α values for these three factors, were 0.88, 0.80 and 0.76 respectively, indicating that the factors were internally reliable.

Safety concerns

The mean and standard deviation scores relating to drivers' concerns over safety were (i) driving fatigue – 3.44 ± 1.39 ; (ii) length of working day – 3.31 ± 1.40 ; and (iii) customer requirements – 2.74 ± 1.47 . Concerns over driving

Employee
Relations
21,4

412

Table II.
Responses and factor loadings for the three-factor model describing the drivers' views on safety management

Item number	Response		Management control	Factor Safety standards	Risk-taking behaviour
	Average	St. dev			
(10)	2.38	1.05	0.768		
(9)	2.10	0.86	0.758	0.400	
(14)	2.49	0.97	0.757		
(4)	2.46	1.10	0.706		
(7)	2.50	1.06	0.636		
(16)	2.06	0.84	0.627		
(15)	2.29	0.91	0.598		
(6)	2.16	0.77	0.569		
(13)	3.08	1.11	0.522		
(20)	2.62	1.12	0.411		
(2)	1.88	0.87		0.817	
(1)	2.19	0.89		0.782	
(18)	2.36	0.83		0.757	
(3)	2.32	0.96		0.633	
(5)	2.25	0.98		0.530	
(19)	3.14	1.06		0.425	
(11)	2.80	1.28			0.829
(17)	2.53	1.12			0.764
(8)	2.97	1.27			0.626
(12)	2.44	1.15		0.447	0.597

fatigue and the length of working day were both significantly ($p < 0.01$) greater than those related to customer requirements.

Safety initiatives

The proportions of drivers in favour of each initiative were:

- (1) use of financial incentive schemes to influence safety performance – 39 per cent;
- (2) a safe driver competition – 52 per cent;
- (3) a drivers' panel to investigate accidents and incidents – 63 per cent; and
- (4) a drivers' panel working with management to improve safety standards – 84 per cent.

Rejection of the use of incentive schemes and acceptance of the drivers' panels were significant at the $p < 0.02$ and $p < 0.01$ levels respectively.

Discussion

When introducing a new employee involvement programme, it is essential that management do not enter the process with preconceived ideas, which may influence the direction and outcomes of the programme. For this reason, an independent facilitator was used throughout to implement the programme. At the outset of the programme, it was considered important to identify a model of

the division's management/workplace/workforce interactions relating to safety to establish a framework against which the survey results and conclusions could be assessed. The questionnaire therefore included a section, which addressed the drivers' perceptions of their own and their managers' actions in relation to the division's current safety management system, as shown in Table I. The drivers' responses to these statements were, on the whole, very positive with scores below 3 (Table II), which reflected the overall positive approach to safety taken by the division's management. However, two statements received average scores greater than 3, indicating that there were some issues causing concerns amongst the drivers. These issues, which related to the correction of unsafe conditions (question 13 – score 3.08) and the dissemination of results from accident investigations (question 19 – score 3.14), both indicated a weakness in management's actions towards unsafe working conditions.

The main activities undertaken by drivers were driving and off-loading fuel at customer sites; safety issues, identified by the drivers, with these activities were the requirement to use vehicles with faults and deliveries at unsafe locations. These aspects were therefore used in the questionnaire to provide an assessment of the safety of drivers' working conditions. Drivers' responses to these questions indicated that uncontrolled risks at customer sites were perceived to be significantly greater than controlled risks arising from company vehicles. This reflected and supported the rigorous standards imposed by management on the use of vehicles within the division, and recognised the lack of control over safety at some customer sites.

Drivers' concerns for safety, identified during the preliminary meetings, were understandably related to their operational activities of driving and work requirements at customer sites. Additionally, there was also a concern over the length of the working day brought about by the number of deliveries required per day, particularly during the winter period, and the consequential impact that tiredness could have on driving safety. Drivers' responses indicated that concerns over driving fatigue and the length of the working day were significantly ($p < 0.01$) greater than that from work requirements at customers' sites.

Current safety initiatives within the division included a travelling road show, a poster campaign and "near miss" reporting. A behavioural safety programme had been considered but was rejected on the grounds that it was not appropriate for lone-working activities. During the preliminary meetings with drivers, the main issue raised with respect to a continuous improvement philosophy was their lack of direct involvement in the development of safety initiatives. The drivers also commented that the current initiatives were considered to be inappropriate to the risks they faced and were not perceived to contribute positively to an improved performance. They did accept, though, that the initiatives were established with good intentions. The two employee proposals for safety initiatives included in the questionnaire therefore revolved around a greater involvement in improving workplace standards and investigating causes of accidents. Managers, at their meetings, felt that

improved safety performance would come from offering the drivers incentives and rewards for good performance. The two management proposals for safety initiatives included in the questionnaire therefore revolved around the use of direct financial rewards for improved performance. These comprised a qualification for a company safe driving competition with the prospect of an overseas holiday during the final rounds for the successful driver. The most important conclusion from the questionnaire, from the management's point of view, was the drivers' responses to these proposed safety initiatives. There had been a strong belief amongst the managers that the proposal to use financial incentives to improve safety performance would receive the highest level of support from the drivers: in fact, it received the lowest level (39 per cent) of support. The response by drivers to the proposal for direct representation in the process of improving safety proved to be so positive that it had to be acknowledged and addressed by management. To understand and explain the reasons behind these results, the drivers' responses to the questionnaire were therefore analysed further.

Factor analysis

The responses to all statements referring to safety management were subjected to an exploratory factor analysis, which identified three factors relating to management control, safety standards and risk-taking behaviour (see Table II). Individual items had high loadings with only two items (9 and 12) showing significant cross-loading on more than one factor. These factors appeared consistent with the main aspects of the company's current management philosophy, described earlier; which were rule-based compliance, management responsibility for implementation of safety issues and low risk-taking behaviour encouraged amongst drivers through an effective training programme.

Structural equation modelling

The three factors relating to safety management, the assessment of workplace conditions and the assessment of drivers' concerns about safety were analysed against a number of hypothetical models. The best fit obtained, in terms of path analysis values, is shown in Figure 1.

This model illustrates how the drivers' perceptions of the division's safety management are related to their assessments of workplace conditions and concerns over safety. It shows that significant relationships exist between management control and both safety standards (0.67) and risk-taking behaviour (0.40), and between working conditions and employees' safety concerns (0.59). There are weaker relationships between safety standards and both working conditions (0.31) and risk-taking behaviour (0.19), and between risk-taking behaviour and safety concerns (0.12). Whilst structural equation modelling cannot define models, it can be used to test the validity of hypothesised models. In this case, the model derived from drivers' responses fitted the drivers' existing working environment. The company's strong safety philosophy and strict rule-based operational system demonstrates the link

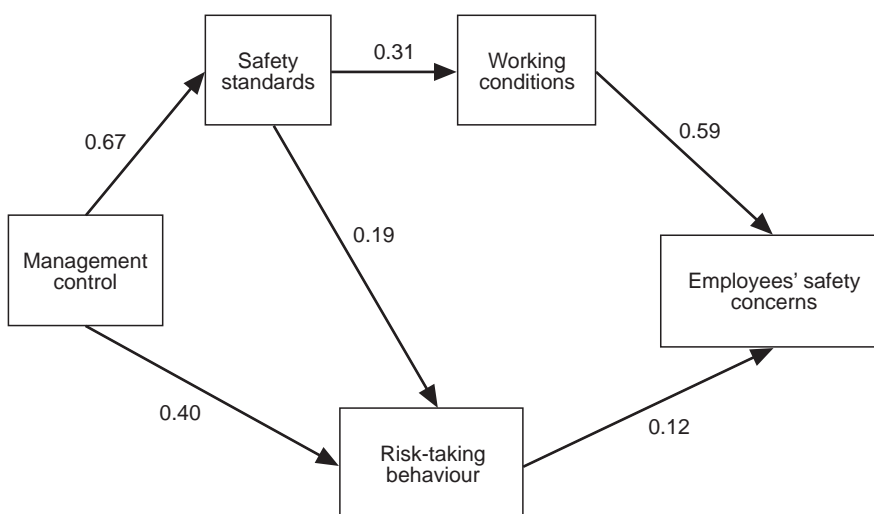


Figure 1.
Model illustrating the
factors influencing
drivers' concerns about
safety

between management control and safety standards identified in the model. However, despite the company's high standards, workplace conditions were frequently outside management's control and were determined, or at least influenced, by a third party. This lack of direct management control over a large part of the drivers' working environment is supported by the moderate relationship shown between safety standards and working conditions and the strong relationship between working conditions and drivers' safety concerns. The weak relationship between safety standards and risk-taking behaviour implies that, in this organisation, management control has a greater impact on risk-taking behaviour. The model also identifies only a weak relationship between risk-taking behaviour and drivers' safety concerns, which supports the high level of competence provided by the safety training accorded to drivers and their belief that residual risk in the work environment arises from other sources.

The agreement between the hypothesised safety model, derived from drivers' responses, and the typical working environment illustrates the understanding by the drivers of the safety issues affecting their work and provides credence in their ability to identify areas for improvement. The drivers' preference for safety initiatives aimed at working with management to improve safety standards (84 per cent) and investigate accidents (63 per cent) shows a confidence in management and a desire to contribute to workplace safety. The relatively low support given by the drivers for the use of financial incentives to improve safety (39 per cent) and a safe driver competition (52 per cent) reflects the weak relationship identified between risk-taking behaviour and safety concerns and the strong link between safety concerns and workplace conditions. It also demonstrates an ability by the drivers to differentiate between issues providing a long-term positive impact on their safety from those providing only a superficial contribution. The weak relationship identified between risk-taking behaviour

and safety concerns also provides retrospective support to the management decision that a behavioural safety initiative was unlikely to be perceived by drivers as an appropriate safety approach in this work environment.

The consistency demonstrated between the drivers' responses on safety management, working conditions, concerns over safety and preferred safety initiatives provided the management group with the confidence to implement a positive action plan based on the outcomes from the questionnaire. A drivers' safety panel consisting of five drivers (England/Wales (2); Scotland (2); Northern Ireland (1)), the transport manager and the safety manager was therefore established with up to four meetings per year planned. Clear terms of reference for the panel's activities were identified. These were to review/debate safety issues affecting drivers; to assess new equipment and training packages and to produce recommendations for safety initiatives. Included within these terms were issues related to work demands, performance indicators, training, vehicle design, communications, hazardous sites, and lessons from accident investigations. The items excluded from the terms included trade union matters, industrial relations and routine safety issues covered by line management. Specific actions taken within the division since the survey include:

- commissioning research work to tackle the problem of driver fatigue arising from the length of the working day;
- the introduction of technology to report and record hazardous sites;
- a customer liaison programme to address the issue of unsafe sites; and
- commissioning the development of a computer-based training assessment programme.

Participation, by the division's drivers, in a company-wide safe driving competition was also confirmed as an additional means of raising awareness, but was not viewed as part of the main improvement strategy.

Those issues affecting the implementation of employee initiatives, identified by Ramsay (1991), were addressed during the programme. Senior management commitment was accepted as an important factor for success and this was demonstrated during several stages. First, the appointment of an external facilitator for the programme established that the assessment of the issues to be included in the programme and the assessment of the results would be treated in an unbiased way. Second, a senior management letter to all drivers supported the questionnaire at the distribution stage. Third, a letter to all drivers at the end of the survey from the division's General Manager, confirmed the commitment to implement the safety initiatives identified during the programme. Fourth, support from the depot managers was sustained throughout the programme by providing them with full information during the implementation stage and then involving them in the communication of the survey results to the drivers. Finally, a representative sample of the drivers was involved in the identification of the issues to be included in the questionnaire and all drivers received information on the purpose and development of the programme prior to the distribution of the

questionnaire. The drivers' panel, which was established as a direct consequence of the programme, had written agreed terms of reference. Any potential conflict between the panel members and depot managers was avoided by declaring that the panel activities would not overlap with or be involved with line management's responsibilities. The level of training provided to drivers and managers within the division was already comprehensive and additional training was judged, at this stage, to be unnecessary.

Conclusions

In some industries, management's attention is often distracted from safety by other issues competing for their time, e.g. production, costs, efficiency, quality and the environment. On the other hand, the workforce's awareness and understanding of safety issues is often more focused as they deal with and suffer from the consequences of operational risks on a daily basis. This case study demonstrates how the implementation of a consensus programme between management and employees can provide a logical and productive approach for the assessment of safety and the identification of potential improvement strategies. The study also demonstrates the benefits of taking account of and addressing the issues, identified by Ramsay (1991), that can affect the successful implementation of employee involvement initiatives. Factor analysis and structural equation modelling have been used to demonstrate that, in a mature, well-managed, safety-conscious organisation, employees' proposals for safety initiatives are consistent with their underpinning perceptions of risk within the working environment.

References

- Bryman, A. and Cramer, D. (1997), *Quantitative Data Analysis with SPSS for Windows*, Routledge, London.
- Chemical Industries Association (1998), *UK Indicators of Performance 1990-1997*, CIA, London.
- Health and Safety Executive (1996a), *Consulting Employees on Health and Safety; A Guide to the Law*, IND(G)232, HSE Books, London.
- Health and Safety Executive (1996b), *A Guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995*, L73, HSE Books, London.
- Health and Safety Executive (1997), *Successful Health and Safety Management*, HS(G)65, HSE Books, London.
- Hurst, N.W. (1998), *Risk Assessment: The Human Dimension*, Royal Society of Chemistry, London.
- Ramsay, H. (1991), "Reinventing the wheel? A review of the development and performance of employee involvement", *Human Resource Management Journal*, Vol. 1 No. 4, pp. 1-22.
- Smith, D., Hunt, G. and Green, C. (1998), *Managing Safety the BS 8800 Way*, British Standards Institution, London.

(Dr Colin W. Fuller is a Lecturer in Health and Safety Management at the Centre for Hazard and Risk Management, Loughborough University, Loughborough, Leicestershire LE11 3TU, UK. E-mail: c.w.fuller@lboro.ac.uk)